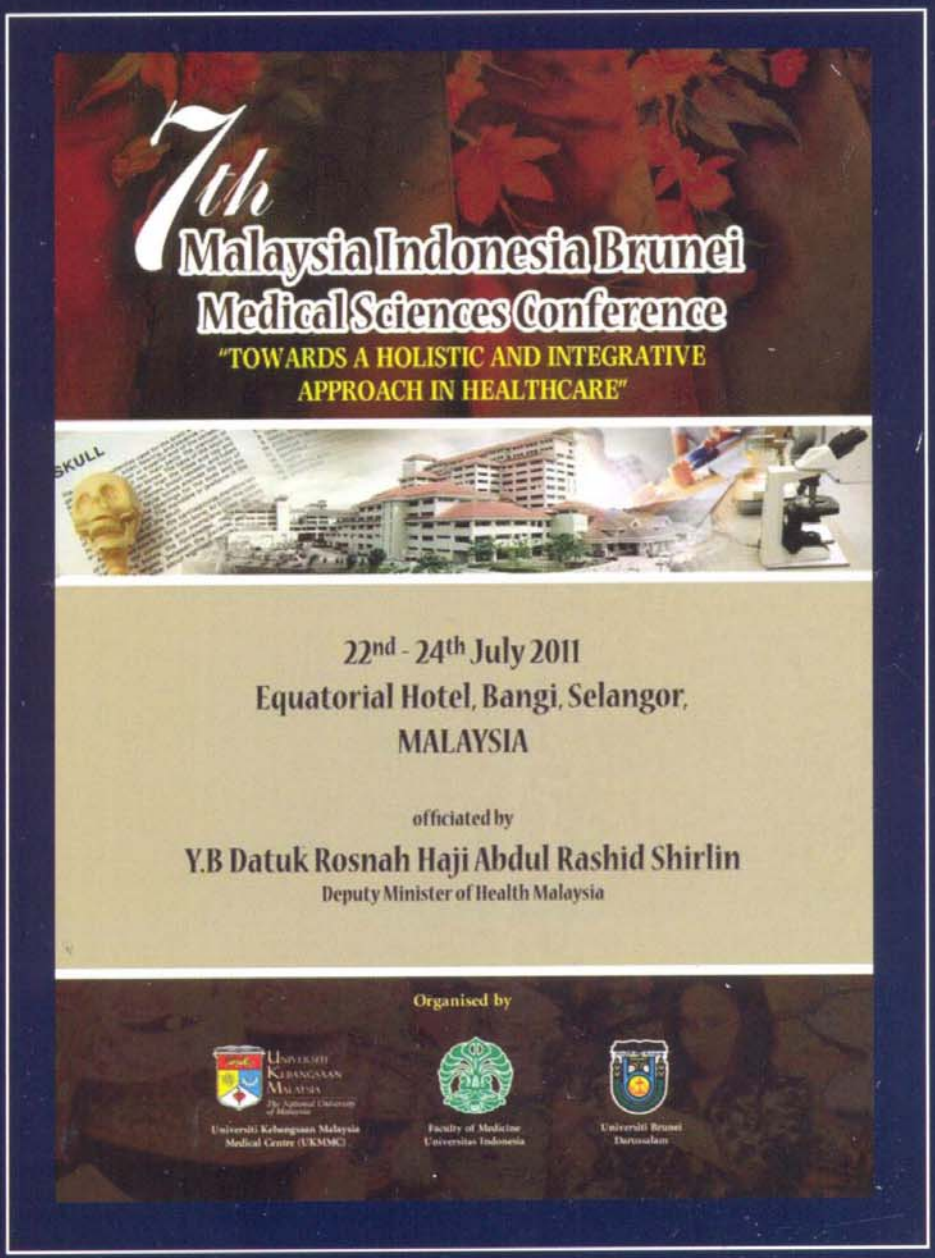
Volume 6, No. 1 (Supplement)
June 2011
ISSN 1823-2140

The National University with an INTERNATIONAL REACH

UNIVERSITI KEBANGSAAN MALAYSIA
National University of Malaysia

MEDICINE & Health

The Official Journal of The Faculty of Medicine UKM



ROLE OF ALLOGENEIC MESENCHYMAL STEM CELLS IN RECONSTRUCTION OF BONE DEFECT IN RABBITS

Phedy, Ismail HD, Achmad AJ, Nyimas DY, Erica K

Department of Surgery, Faculty of Medicine, Universitas Indonesia, Indonesia

Background:
Management of bone defect remains unsatisfactory and need better approach. Mesenchymal stem cells, being able to differentiate into osteoblasts cells needed in fracture healing, may possess the ability to manage bone defect. We question whether transplantation of mesenchymal stem cells, particularly in combination with hydroxyapatite-calcium sulphate pellets in bone defect will result in better callus thickness and osteocyte index.

Methods:
Twenty eight giant flamish rabbits weighted 2.70 kg were used as the experimental animals. They were randomly allocated into four groups of intervention, each receiving autograft, hydroxyapatite-calcium sulphate, hydroxyapatite-calcium sulphate combined with marrow aspirate, or hydroxyapatite-calcium sulphate combined with 2x106 MSCs. Defect of one centimeter long was created and fixated with mini plate-screw and two circlage wires despite the treatment groups. The defects were then transplanted with graft according to the allocation group. Callus thickness was measured blindly by two authors working independently from radiographs taken at 4, 8, 12 weeks after transplantation. At the end of the study, the rabbits were sacrificed for histological staining and osteocyte index was obtained. Data were analyzed by one-way ANOVA test.

Results:
The callus thickness differed significantly at the fourth week ($p=0.018$) but not after that. Osteocyte index also tended to be higher in mesenchymal stem cells group.

Conclusion:
MSC transplantation in bone defect results in significant faster callus formation. It also shows tendency to generate thicker callus.

Keywords:
Mesenchymal stem cells, bone defect, hydroxyapatite-calcium sulphate, callus thickness, osteocyte index